

1/15/09 Initial Meeting (Class Day 1)

- Intro to class, requirements, timeline (handouts)
- Intro to industry contacts, resumes (handouts)

2 industry contacts per group  
weekly conference calls

1 formal note taker (notes project file)

gather + sort what's important

1/17/09 Class Day 2

- Discussion of class format
- Received 1 handout and 1 resume

- Must pick teams and email prof.

1/22/09 Class Day 3

\*Reminder: Every 3<sup>rd</sup> week meet on Tuesday  
2pm-6pm for presentations with Industry contacts

- FE exam signup deadline March 12<sup>th</sup>

- Teams/mentors assigned
- contact info to come

- In 1 week, "1<sup>st</sup> Group Meeting"

- Conceptual Design

- Report outline

- Design Basis

} a "checklist" for the project

## - Presentations

- written

- oral (~20 min)

- Start Telecons ASAP with mentors/clients

- You may contact other mentors - each has a specialty

- Project research tools: wikipedia, engr. news magazine, AIChE, google, uic's library

1/21/09 Initial Email to Dennis O'Brien

- schedules + contact info

\* Teleconference Time: 12 pm - 1 pm on Wednesdays

## Conference Call 1

Goals: brainstorm topics

H<sub>2</sub> production? gasification?

\* need to decide: feed, purification methods

\* topic approved

- concerns: storage - via absorption or mol. sieves?

U. Idaho / AIChE summer / Penn State

- our economic analysis will be limited

\* requirements: diagram, basis/flow, feed, purification specs  
99.5% H<sub>2</sub>?

\* which coal?

-Dennis can provide steam requirements,  $N_2$ , air, etc...

\* block flow diagrams - expanded slightly into process flow

-Dennis will try to find an existing P&ID  
-look up some  $H_2$  plants: Fraxair, air products, air liquefied, BOC, Hot Baker (sp???)

-alternate feeds: sawdust, municipal wastes  
-2 semi-commercial plants make  $EtOH^2$ , generating syngas/plasma

Action Items for tomorrow at 1pm

-look into feeds (coal + alternatives)  
-look into purification methods

1/22/09

Class Day 4

Weekly Telecon Agenda (~30 min)

- review progress
- identify action items
- set rules/responsibilities
- other ideas

\*send read-ahead material

\*Municipal Waste Arguments: energy goes in to its storage in landfills already, no/less storage space required

\*MSW problems: variable composition

Problems w/ switchgrass: finding efficient + economical conversion methods

### Class Progress/ Ideas:

Alpha: syngas  $\rightarrow$  alc mix using MSW or switchgrass

Bravo: cell  $\rightarrow$  EtOH;  $\text{NH}_3$  production; pharma; chem path

Charlie: lignocell  $\rightarrow$  EtOH

Delta: refining tar sand / salt production

Echo: gasif  $\rightarrow$   $\text{H}_2$  using coal, MSW or biofeedstocks

Foxtrot: biomass  $\rightarrow$  EtOH / nuclear waste

### Meeting with Dennis

- need flowscheme

- talk to Peter Clark - was on Harold Washington's committee on solid wastes (currently IFT)

- research gasification, plasma torches

- municipal waste - free for 1<sup>st</sup> 3 years, then...

- U Texas 2007 fuels + petrochemicals speaker (AIChE website)

- economic policy

\* email Dennis if can't find

### Meeting with Peter Clark + Dan Rasinack

- hurdles: cost - share benefits with municipality

- his opinion: best way to use waste, is to burn it, but even this has problems

- about 55% of Chicago waste is paper



- NY doesn't have garbage disposals - high organic content
- how to get it in/out reactor?
- what to do w/ residue?

\* suggests presorting / concentrating

- plastic good fuel source - BUT probably has higher value as plastic

- colors + pigments - incombustibles

- gasification = combustion with little  $O_2$

\* look into FCC then talk to Dan

- pyrolysis - separate  $O_2$  and  $N_2$
- Keller <sup>Biomass</sup> Bioprocessing in NY

- Dan's idea

\* Northern Illinois Regional Planning will have solid waste information

Chicago used to be leader in incineration - air pollution ended this b/c of regulations

- \*  $H_2$  - not transported very far - think about market
- maybe produce syngas?
- Chicago doesn't have a lot of uses for it

~~maybe refinery or oil refinery~~

- Fischer-Tropsch fluid has no sulfur and high cetane #

- MSW collection: 1) Blue trucks to houses - municipal (~1/2)  
2) Business - private contractors (~1/2)

- density issues - compacted / not?

\* avoid taking construction debris

\* composition - as much as 50% swings

- how to cope?

\* simple, dumb, strong reactor that can take anything

- steam reforming - water that's in the waste